What I claim is:

1. A Stirling engine comprising a casing, a displacer arranged in said casing so as to slide, an expansion chamber and an operation chamber into which, and from which, an operation gas flows with the operation of said displacer, and a power piston that is operated in response to a change in the pressure of the operation gas in said operation chamber, wherein said Stirling engine further comprises:

a displacer operation means having a moving yoke disposed in said displacer, and a pair of electromagnetic solenoids disposed to surround said moving yoke and juxtaposed to each other in the axial direction in said casing;

a power piston position detection means for detecting the operation position of said power piston; and

a control means for controlling to switch over the excitation of the pair of electromagnetic solenoids of said displacer operation means based on a detection signal from said power piston position detection means.

2. An actuator comprising a casing, a displacer arranged in said casing so as to slide, an expansion chamber and an operation chamber into which, and from which, an operation gas flows with the operation of said displacer, and a power piston that is coupled to a to-be-operated member and is operated in response to a change in the pressure of the operation gas in said operation chamber, wherein said actuator further comprises:

a displacer operation means having a moving yoke disposed in said displacer, and a pair of electromagnetic solenoids disposed to surround said moving yoke and juxtaposed to each other in the axial direction in said casing; and

a switching-over means for switching over the

excitation of the pair of electromagnetic solenoids of said displacer operation means.

3. A Stirling engine comprising a casing, a displacer arranged in said casing so as to slide, an expansion chamber and an operation chamber into which, and from which, an operation gas flows with the operation of said displacer, and a power piston that is operated in response to a change in the pressure of the operation gas in said operation chamber, wherein said Stirling engine further comprises:

a displacer operation means having a moving magnet disposed in said displacer, a fixed cylindrical yoke disposed to surround said moving magnet in said casing, and a pair of coils disposed on the inside of said fixed yoke;

a power piston position detection means for detecting the operation position of said power piston; and

a control means for controlling to switch over the direction of an electric current supplied to the pair of coils of said displacer operation means based on a detection signal from said power piston position detection means.

4. An actuator comprising a casing, a displacer arranged in said casing so as to slide, an expansion chamber and an operation chamber into which, and from which, an operation gas flows with the operation of said displacer, and a power piston that is coupled to a to-be-operated member and is operated in response to a change in the pressure of the operation gas in said operation chamber, wherein said actuator further comprises:

a displacer operation means having a moving magnet disposed in said displacer, a fixed cylindrical yoke disposed to surround said moving magnet in said casing, and a pair of coils disposed on the inside of said fixed yoke; and

a switching-over means for switching over the

direction of an electric current supplied to the pair of coils of said displacer operation means.